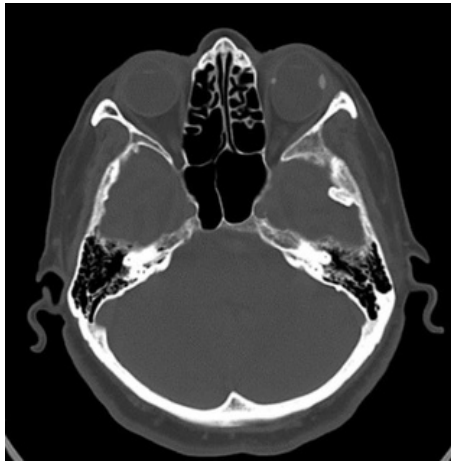


Scleral Buckle: CT Recognition and Reporting

1. Standard Device Name



A **scleral buckle** is a supporting implant placed on the outer surface of the globe during retinal detachment surgery. The term “scleral buckling band” is also used in clinical practice.

The material may take the form of a band surrounding the globe (**encircling band / cerclage band**) or a segmental implant supporting a specific region. Therefore, not every scleral buckle completely encircles the globe. [1,2]

2. Why Is It Used?

Its main indication is **rhegmatogenous retinal detachment**, that is, retinal detachment caused by a retinal break. The aim is to provide external support at the site of the retinal break, helping the retina reattach. It may be used alone or in combination with other surgical procedures, such as vitrectomy. [3,4]

3. How Is It Placed, and How Does It Work?

The material, usually silicone-based, is positioned and secured on the outer surface of the sclera beneath the conjunctiva. Encircling bands pass beneath the rectus muscles and surround the globe. [4]

The external pressure exerted by the implant indents the eye wall inward. This helps bring the retina closer to the underlying tissues at the site of the break and reduces vitreoretinal traction. When necessary, cryotherapy or laser treatment is also applied to create adhesion around the break. The implant is usually left in place permanently. [3,4]

4. Imaging Recognition Tips

The key CT finding is a band or segmental implant located outside the globe, following the scleral contour. Solid silicone implants may appear hyperattenuating, whereas other

materials, such as silicone sponge, may have low attenuation. Therefore, not all scleral buckles are expected to have the same attenuation. [1]

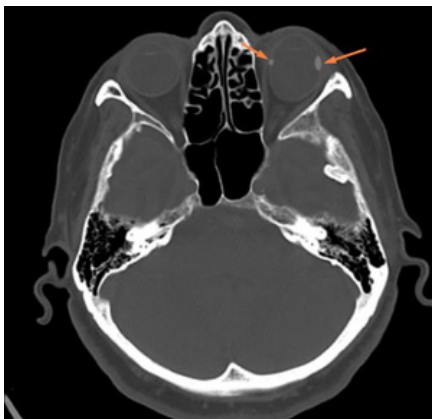
An encircling band may appear as separate foci on either side of the globe on an axial image. Sequential images and multiplanar reconstructions are assessed together to recognize these as cross-sections of a single structure. Segmental implants produce localized scleral indentation in a specific region. [2]

Why Is It Not Intraocular Silicone Oil?

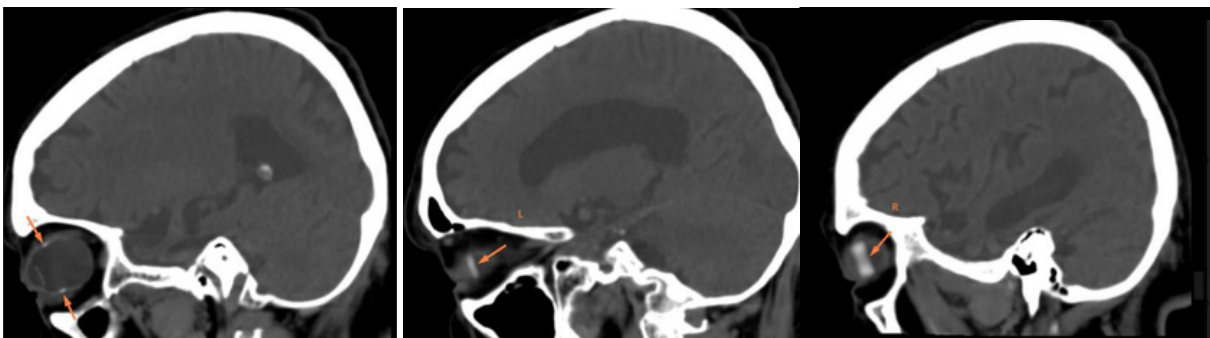
Silicone oil is located within the vitreous cavity, whereas a scleral buckle is outside the globe. Because both may appear hyperattenuating on CT, anatomical location should be assessed before attenuation when distinguishing them. On MRI, silicone buckle material generally has low signal intensity on both T1- and T2-weighted images. [1]

5. Findings in Our Case

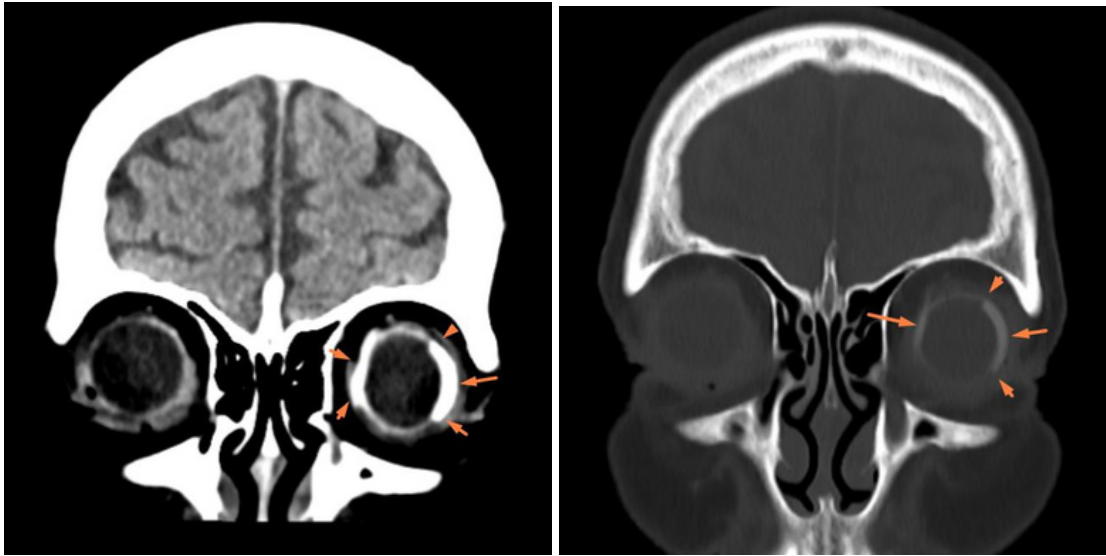
CT images demonstrate hyperattenuating band material completely surrounding the left globe, consistent with an **encircling scleral buckling band (encircling band / cerclage band)**. The structures seen as separate medial and lateral foci on the axial image represent cross-sections of the same band.



Axial CT: Hyperattenuating cross-sections of the encircling band are seen adjacent to the medial and lateral aspects of the left globe



Sagittal CT: This plane allows assessment of the relationship between the scleral buckling material and the globe contour, as well as the level of its placement. Any localized contour change produced by the implant can be assessed in this plane.



Coronal CT: This plane helps assess the extent of the implant around the globe. Sequential sections should be reviewed together to distinguish an encircling band from segmental supporting material.

6. Sample Reporting Phrases

Sample report for our case:

“Hyperattenuating band material circumferentially encircling the left globe is consistent with prior scleral buckling surgery.”

If localized indentation is also visible:

“Scleral buckling material is present along the outer surface of the left globe, producing localized indentation of the adjacent scleral contour.”

The statement “No complications are identified” should be used only when the implant and surrounding tissues have been adequately assessed.

7. Scleral Buckle on CT: Position and Potential Complications

When scleral buckling material is identified on CT, assessment should include not only the presence of the implant but also its relationship to the globe wall and surrounding tissues.

The course of the material should be traced to assess for significant displacement, particularly anterior migration; extension through the sclera into the globe; and an abnormal relationship with the rectus muscles. Smooth scleral indentation produced by the implant is an expected surgical effect and does not, by itself, constitute a complication. Prominent surrounding soft tissue, scleral thickening, preseptal edema, orbital fat stranding, or a collection raises suspicion for inflammation/infection. However, these findings should be interpreted in the clinical context, particularly in the early postoperative period.

Thin sections and multiplanar reconstructions facilitate assessment; comparison with previous imaging is valuable for identifying displacement. Nevertheless, superficial conjunctival dehiscence and external exposure of the implant, small scleral erosions, or functional extraocular muscle restriction cannot be reliably excluded by CT. Although CT can demonstrate overt structural complications, it cannot independently confirm that the implant supports the retinal break at the appropriate location and with sufficient pressure, or that the retina is attached. [2,5]

8. Reporting Checklist

Side: Right, left, or bilateral?

Location: Is the material outside the globe?

Extent: Encircling band or segmental implant?

Globe contour: Is there expected indentation or a conspicuous deformity?

Implant and surrounding tissues: Is there displacement, erosion into the globe wall, or any finding suggesting surrounding inflammation?

Associated surgical material: Is intraocular silicone oil, gas, or an intraocular lens present?

9. Practical Pearl

Assess the location first: A band following the outer contour of the globe suggests a scleral buckle, whereas hyperattenuating contents within the vitreous cavity suggest intraocular silicone oil. A hyperattenuating appearance alone does not indicate metal.

10. References

1. Ito Y, Yamazaki I, Kikuchi Y, et al. Imaging characteristics of the postoperative globe: a pictorial essay. *Jpn J Radiol*. 2016;34:779–785. doi:10.1007/s11604-016-0587-6.
2. Innovative multiplanar reconstruction and volume-rendered computed tomography in the assessment of scleral buckle-related complications. PMID: 25719983.
3. National Eye Institute. Surgery for Retinal Detachment. December 6, 2024.
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5. Radiologic findings in infected and noninfected scleral buckles. PMID: 17932859.